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ABSTRACT

In response to requests from the University of Alberta Department of Computing Services for PLATO (Programmed Logic for Automatic Teaching Operations) applications in structured learning situations, a program for computer-assisted bibliographic instruction (BI) was developed. The program is divided into the following six units: (1) Introduction; (2) How to Find Books; (3) How to Find Periodicals; (4) Research Strategy; (5) Simulation 1, a hypothetical English assignment; and (6) Simulation 2, a hypothetical political science term paper assignment. Quizzes administered after the second and third units require a grade of 75% or better to proceed, and scores are assigned to performance on the simulations. To test the program, an experiment was conducted in which half the students in each English 200, 210, and 215 class viewed the PLATO program and half received traditional BI. Control group students completed questionnaires containing questions identical to those answered by the experimental group in response to the quizzes and simulation exercises. Results for the experimental group showed that these students selected many more correct answers than incorrect answers, indicating that PLATO can effectively and efficiently teach elementary and essential library skills, and that, although it has limitations, it can effectively be integrated into a comprehensive BI program. Results for the control group are not reported here. (KM)

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Computer Assisted Instruction and Bibliographic Instruction: Preliminary Data on the use of PLATO in the BI program of the Humanities and Social Sciences Library, University of Alberta

Abstract: The use of computer-assisted instruction (CAI) in bibliographic instructions (BI) is a concept which needs empirical testing and real-time experience. The University of Alberta Humanities and Social Sciences Library used PLATO to develop self-paced learning modules to instruct freshmen in basic BI. Initial data indicates that CAI in BI, especially PLATO, holds great promise for BI.

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Computer Assisted Instruction and Bibliographic Instruction: Preliminary Data on the use of PLATO in the BI program of the Humanities and Social Sciences Library, University of Alberta

Introduction

The field of bibliographic instruction (BI) is maturing as a discipline within librarianship. Evidence of this maturation is easily found in the professional literature - not only is BI becoming entrenched in concepts of public service, it is also becoming more sophisiticated in delivery systems and in evaluations of usefulness. Few librarians fail to acknowledge the usefulness of BI as an academic experience and more educators are coming to see BI as an important part of the foundation of a liberal education. Thus both the practical utility and the competent pedagogy of BI methods are being recognized as necessary and legitimate professional endeavours. Upon this base of acceptability is most research in BI built.

Research in librarianship in our high-tech age increasingly involves the use of computers. The development of computer-assisted instruction (CAI) in many other fields has lead to the refining and development of a few very good software programs that allow the viewer-student to engage in a productive and meaningful educational

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experience while at the same time utilizing widely available materials in a uniquely singular way. While others of his classmates breeze through a lesson, the student may privately spend as much time as necessary on a difficult concept; this ensures privacy from peer ridicule, which is often a significant learning barrier, and it ensures completeness of learning.

Both of these elements are important considerations for BI. Library skills may be perceived of by many students as unnecessary to one's academic career; therefore anyone spending what may appear to be inordinate amounts of time learning about the library may produce peer ridicule to the extend that any BI lesson may only be halflearned at best or completely unlearned at worst. When peer pressure is not a factor, the speed at which a BI concept is presented may be too great to allow comprehension by the student. In librarian-delivered lecture-type BI sessions (to groups of 10 - 45 students), there is no allowance for student differences. Where a professor may make allowances for a particular student's learning abilities (he has an entire term to make those determinations), the BI librarian has no such luxury. His total time with the students is likely less than an hour. Under these constraints, a BI delivery system that allows both quality learning opportunities and private learning situations would seem to be ideally suited for BI applications. The following outlines one experience with CAI for BI in an academic library setting.

Description of Project

In October 1982, the author responded to a call for proposals from the Department of Computing Services (CDS), University of Alberta, which requested submissions for possible PLATO applications in structures learning situations. The proposal consisted of an outline of learning objectives, many of which were objectives of existing BI programs. After discussions with programmers and project directors at CDS a narrative script was produced. It contained all the information that was considered important for students to know about initial library use: how to use either of the card or micro fiche catalog; what a call number was; what a location code meant; how to read a periodical index citation; how to use the microfiche Serials List and read a call number and location; plus 2 simulations, one an English parodigm related to material mentioned earlier in the script; the other, simulation designed to test the application of library skills acquired in one environment (English) in another (political science).

Mr. David Karpoff was project director and Mr. John Leung was the programmer. Working with John we were able to determine which words needed special highlighting, which phrases needed emphasis, and where PLATO's many special effects could be used. Two quizzes were designed after the first two sections to test comprehensive and pass grades of 75% or better were necessary to proceed. Scores were also kept at each of the two simulations.

As the program began to take form, an experimental design was also developed. It was proposed that students in English 200, 210 and 215 (those who would normally be included in BI) would become the experimental and control groups. It was envisioned that half of a class would randomly be chosen to participate in viewing the PLATO program, the other half being the control and receiving their BI with traditional, librarian-slide/tape delivery systems. The experimental group would consist of about 100 students and the control group would be only marginally larger, as the division of the group would occur at the beginning of the BI session and late-comers would be forced to join the control group. Librarians normally involved in BI were briefed about the experiment's design and generally seemed cooperative.

The results of the new project were tabulated automatically on the PLATO terminals; the control group received questionnaires with the same questions and were asked to manually provide answers. These were then tabulated and compared.

Description of the PLATO program and Quiz and Simulation Questions

The PLATO program was divided into 6 units: Introduction; Section I: How to Find Books; Section II: How to Find Periodicals; Section III: Research Strategy; Simulation One; and Simulation Two. An introductory statement of purpose preceded actual testing: "This lesson will show you two things: 1) How to find materials such as books and periodicals or journal articles in the library; and 2) How

to conduct research in the library." It then proceeded to define a library and explain some of the simple commands necessary to operate the terminal.

Section I: How to Find Books was aimed at reinforcing the concepts of call number and location. The microfiche catalog was described and its date limitations were explained (no material in it older than 1974). An example from Shakespeare was used to show how the configuration of the fiche entry contained both call number and location information. The special effects available on PLATO allowed for the "boxing-off" of a specific title (Mid-summer Night's Dream) and for the flashing on and off of the call number. Another example using an anthropology title reinforced the spatial concept of title and location, again utilizing flashing underscoring.

A replica of a card catalog card was also provided illustrating the call number and location in the upper-left hand corner, using PLATO's special visual enhancements. A review of the principles of call number and location discrimination were provided prior to allowing the student proceed to the quiz. Quiz number one consists of 8 questions, three quarters of which must be answered correctly to allow the student to advance to section 2.

Section II: How to Find Periodicals was designed to teach students how to decipher an index citation to determine the more valuable parts. It began by explaining what a periodical index was

intended to do and how it was arranged. It itemized 6 important constituents of a citation emphasizing that in our library the full journal name was most important as that was needed to obtain a call number and location from the Serials List. Again the special visual effects of the PLATO software allowed for highlighting and underscoring of these essential parts. A representation of the Serials List was used and the call number and location segments received special emphasis. Another review preceded the second quiz.

The second quiz followed a true/false and a multiple choice answer format. Eight questions were asked and 75% was again required as a pass grade to allow continued progression.

Section III: Research Strategy was intended to help solidify the monograph and periodical search skills and catalog information discrimination skills mentioned in Sections I and II. A paradigm on Margaret Atwood and Canadian Literature was used as a hypothetical class assignment, simulating what might be expected in an English 200-level class. Section III introduced mock-ups of bibliographies and indexes, specifically MLA Bibliography, Humanities Index and Canadian Periodical Index. The special effects were very useful here as they allowed for highlighting individual titles in an index one by one. Certain important parts of the indexes were noted and visually emphasized by flashing arrows, such as "see also" headings. The difference between articles authored by and those about Margaret Atwood were clearly illustrated. Reinforecement on the use of tracings was provided through a mock-up of the Subject Microfiche.

Additional information considered useful for the students was also provided in this section. Sample pages from one MLA Handbook were reconstructed so that students were shown footnote and bibliography formats. Sample footnotes and bibliographies in their completed states were also given.

Simulation I was an explicit, hypothetical English 215 assignment on Atwood's feminist attitudes in her novels. Questions in the simulation were designed to evaluate how the student conceived of library organization and to test immediate application of research skills. They involved the interpretation of replica subject fiche entries (to determine call number, location code and tracings descrimination) and the manipulation of information in a sample index citation that could ultimately lead to obtaining the periodical. The 75% pass standard applied to both simulations.

Simulation II was an attempt to test the ready transferal of library skills acquired in one discipline to a research situation in another discipline. The student was encouraged to respond to this term paper assignment: "Does the United States exercise undue influence over Canada?" (a question taken from a political science course syllabus). As in the other simulation, sample fiche and periodical index entries and tracing were used to test how well students had assimilated the earlier learning and whether the student could think through an "unexpected" or unfamiliar topic.

The Results of the Experimental Group

The following preliminary data from the quizzes and simulations have been accumulated for the experimental group.

Quiz I: Question 1.1: Asks the student which 2 kinds of catalogs will help him find books in the Library. Of 25 respondents 13 chose microfiche catalog and 12 chose card catalog, the correct answers. No one chose mail order catalog, alphabetic catalog nor Dewey decimal catalog. The average time used to complete this question was 31.3 seconds.

1.2: "The microfiche catalog is for materials obtained by the University after 1974 - true or false". 25 respondents chose the correct answer "true"; only 1 chose false. 18.1 seconds.

1.3: "Both of the Catalog systems in the Library have author, title and subject sections - true or false". All the respondents chose "true", the right answer. 15.6 seconds.

1.4: Consisted of a replica of the author fiche for Jane Austen's Pride and Prejudice: students were asked to identify the author, title, call number and location. Only 9 students were able to get all four questions. 59.9 seconds.

Quiz 2:

2.1: "Periodical articles are useful for obtaining general background information - true or false", 26 respondents chose true, the right answer, 2 chose false. 11.2 seconds.

2.2: "Step 1 in obtaining periodicals is to consult: periodical index (answer d)": 19 chose answer d, 4 chose serials list, answer c, 1 chose author fiche, answer b. 13.5 seconds.

2.3: Step 2 is getting a call number and a location from the serials list, answer c: 15 chose answer c, 1 chose answer a, get a call number only, 1 chose answer e, location only. 32.9 seconds.

2.4: Identify the journal title, holding, call number and location from a replica serials list entry: only 6 students got all the answers correct. 66.3 seconds.

2.5: Step 3 in finding periodical article, answer d, finding the periodical in the right library: 21 students got this right. 20.4 seconds.

Simulation 1:

1.1: Asks what the student would do first with a hypothetical English 215 assignment on Atwood: 16 respondents chose the right answer, "plot out how you attack the assignment"; 3 chose to consult the MLA Handbook and 3 chose to browse the stacks. 24.4 seconds.

1.2: Asked students to make a program choice - either books or periodicals.

1.3a: asked students "For books where will you go now?" 11 chose subject fiche, 7 chose author fiche, 2 chose title fiche. 18.8 seconds.

1.4a: multiple response question based on mock-up of Subject microfiche: asked to identify subject heading, tracings: only 3 got all the answers right. 60.6 seconds.

1.5a: asked which was needed to find a book by Barbara Hill Rigney (a test of call number and location discrimination skills): 20 got all answers right. 22.1 seconds.

1.6a: asked students to choose all relevant tracing: 21 chose all correct responses. 18.3 seconds.

1.7a: asked students to identify a call number: 30 students got it right. 10.6 seconds.

1.8a: asked students to identify 2 library locations: 32 students got all correct. 10.2 seconds.

1.3b: asked: "For journal articles, where will you go first?" 30 respondents chose 'periodical indexes' as the correct answer. 11.9 seconds.

1.4b: asked: "Which, if any of the following, periodical indexes will you consult?": 11 chose MLA, 16 chose CPI, 8 chose Humanities Index. 22.4 seconds.

1.5b: asked to identify constituent parts of a citation: 9 chose author, 9 chose journal title, 11 chose article title, 9 chose year of publication, 4 chose call number (wrong), 7 chose volume number, 2 chose location (wrong), 7 chose page number. 51 seconds.

1.6b: asked students what they would do if an index turned out to be a dead end: 7 chose 'check out alternate ways of describing topic', 13 chose "see also" headings, 6 chose 'check out other volumes', 10 chose 'check out indexes'. 33.6 seconds.

1.7b: asked students what information on Atwood could be obtained by using Concise Bibliography of English Canadian Literature: 12 said it gave bibliographical details on Atwood; 1 said it gave facts on Atwood's life; 3 said it gave addresses of people who analyzed Atwood's writing; 4 said it gave call numbers for Atwood's work. 32.3 seconds.

1.8b: asked students to choose between MLA Handbook, Turabian on APA Manuals as a style guide: 28 chose MLA, 3 chose Turabian, 1 chose APA. 7 seconds.

Simulation 2:

2.1a: asks students to chose a subject heading most relevant to the hypothetical consignment on "Does the U.S. exercise undue influence over Canada?": 12 chose the best subject heading, "Canada - Politics and Government"; 6 chose "U.S. - politics and Government"; 6 chose "Leaders of Friendly Nations - Comparisons"; 2 chose "NATO - Leaders, parties with". 25.2 seconds.

2.2a: asks: "What will the tracings tell you?": 5 said "other book titles"; 1 said "other authors"; 18 said "other subject headings"; 1 said "other subject catalogues"; 1 said "other periodical articles. 20.4 seconds.

2.3A asks if the entry replica shown on the screen is suitable for the assignment - yes or no: 23 said yes (right); 3 said no. 27.6 seconds.

2.4a Using the previous citation, it asks whether the tracing would help: 29 said yes (right); 1 said no. 8.6 seconds.

2.5a: a series of questions asks where the title, call number and location is of the previous question's replica: 27 answered all questions correctly. 18.7 seconds.

2.1b: asks what the 2nd citation is in a replica of the index page: 18 chose the correct answer. 32.1 seconds.

2.2b: In the same replica, how many authors are listed: 14 chose the correct answer. 23.4 seconds.

2.3b: Still using the example above, which is the longest article?: 13 gave the correct response. 29.5 seconds.

2.4b: asks which journal from the example was published first: 21 chose the right response. 22.4 seconds.

2.5b: asks students to evaluate which journal deals with an improvement of the issue. 24 chose the correct answer. 23.4 seconds.

Analysis of Preliminary Data from the Experimental Group

the learning objectives of Section I were partially achieved. Half the respondents chose the microfiche catalog and half chose the card catalog - it was hoped that all would choose the microfiche Catalog but that none of the non-library choices were selected seems to indicate that at least students know to look in one catalog or the other. The average time to complete this question was just over half a minute, part of which may be simply becoming used to the format of the question and response procedures. When asked about the truth or falseness of question 1.2 "The microfiche catalog is for materials obtained by the University after 1974", only 1 student did not choose the correct answer. From this, it seems that the goal of underlining the time differences in the catalog has been reached. Students seem to be aware that the fiche catalog only goes back to 1974. It took an average of only 18 seconds to make that choice, which would seem to indicate that the question did not pose much difficulty. Another question that was easily answered by all respondents was 1.3, the author, title, subject arrangement of the fiche catalog. 15.6 seconds was the average response time, indicating both a familiarity with the quiz procedures, and the rememberance of the Section I lesson. The responses to question 1.4 are difficult to interpret; only 9 students got all answers correct, and the average time to complete this question was one minute. The question asked a number of identifying questions similar to material presented in Section I. Why students did poorly here and took so long is an area of further research.

Quiz two dealt with periodicals. Question 2.1 had 26 respondents who chose the correct response in an average or 11.2 seconds. This would seem to give credance to the assumption that students remembered the general, background nature of periodicals which was illustrated in Section II. But knowing that, students faired less well when asked to methodically plot out the three steps of periodical research. 19 chose the correct answer to 2.2, 5 did not. The average response time of 13.5 seconds would seem to indicate that even when making a bad choice, the speed with which it was made may mean the respondent thought it was the right choice (if the respondent was at all unsure he most likely would have delayed making a response; if he was completely unknowing he would wait until the "last" second to make a choice, and even in guessing would have elongated the average response time). The vast majority of respondents correctly chose the answer to 2.3 but some uncertainty about the right choice may be interpreted in the length of the average response. By far one of the more difficult questions was 2.4, where identification of essential information from the serials list entry was required. Only 6 students got this answer completely correct and the average response time was 1 minute 6.3 seconds. The reason for such a poor success rate may mean that learning in this particular area was not complete, though to the author it seems that the question was no more difficult than any other. This will likely be an area of further research. 2.5 was the third step in the

periodical process and 21 students got this part correct, in the average time of 20.4 seconds. That students could do reasonably well on 2.2, 2.3 and 2.5 but do so poorly on 2.4 is puzzling. One explanation may be either hardware or software malfunction.

Simulation 1 was an attempt to see how students could utilize the basic library skills taught in Section I and II and integrate those with the research skills in Section III within the context of a hypothetical English assignment. 1.1 was structured so that some apparently satisfying responses were weighed against the more methodical (and correct) plot out one's research strategy. 16 respondents chose the correct answer but, confusingly, 3 chose to consult the MLA handbook which they should have known only gave information on how to type footnotes and bibliographies. 3 chose to browse the stacks which may be an accurate statement of how students actually initially tackle research assignment. 1.2a wanted to see if students could be directed to one or another part of the fiche catalog and which part would be best for their purposes. Hearteningly, 11 chose the subject catalog in only 16.8 seconds. Once could assume that the learning objectives had been achieved. But only 3 respondents got all parts of 1.4a correct, which asked to identify parts of a replica subject fiche entry. One minute was required to answer the question as an average and why so few did so well over such a long period of time remains unclear. Contrasted to 1.4a is 1.5a which identified the author from a fiche replica and all students responded correctly in an average of 22.1 seconds. Students also did very well on one of the big learning goals, that of tracing identification. 21 students

correctly answered 1.6a in an average of 18.3 seconds, which may mean that the tracings were an easily identifiable entity once their purpose on the fiche was explained. The quick (10.6 second) identification of call numbers (1.7a) would seem to indicate that learning about call number discrimination had occurred, as had the even quicker (10.2 seconds) apparent learning about location code identification - all students responded to 1.8a correctly.

Responses to the periodical aspects of Simulation 1 seem to indicate partial achievement of learning objectives. After having 30 respondents choose periodical indexes as a place to begin to find journal articles (1.3b average time 11.9 seconds), the data seems to become temporarily muddled. When asked to choose which periodical index would assist their research on Atwood (1.4b) 16 chose CPI, 11 chose MLA and 8 chose Humanities Index, all good choices but MLA would have been the preferred choice (average time 22.4 seconds). 1.5b asked to identify constituent parts of a citation. 7 chose all the correct parts, but almost that number chose irrelevant data such as call number and location. Perhaps over-learning of these 2 items showed results on this question. But many students were able to choose the most important part, the journal title, though article title was most frequently chosen of all choices. This may indicate that further work on citation essentials is necessary. Average time for ths question was 51 seconds. 1.6b was designed to see if students could think their way out of an index's dead end and

generally the results were encouraging. No one said "quit"; 7 chose "alternate ways of describing topic"; 14 chose to use "see also" headings; 6 chose to "check out other volumes"; 10 chose to "check out other indexes". The average time was 33.6 seconds and would seem to indicate that students are generally resourceful in pursuing information. The short response time span may indicate that students may try only one of the responses before becoming sufficiently frustrated that they quit. It would be interesting to see just how long students will pursue a topic in periodical indexes. The concept of usefulness of a bibliography was tested in 1.7b (average time was 32.3 seconds). 12 respondents gave a correct answer but amazingly 3 respondents said the Concise Bibliography of English Canadian Literature said it gave the addresses of people who analyzed Atwood's writings. One may here attempt to account for a "sense of humor factor" in that respondents were by now getting tired of the experiment and sought some kind of anxiety or frustration release in choosing an off-the-wall response. The vast majority of respondents chose MLA as the preferred style manual, which was not unexpected. This response time was the quickest (7 seconds) tending to indicate this was something they already knew.

Simulation 2 wanted to see if the skills learned in an English paradigm could be easily transferred to a political science paradigm and by and large they were. 2.1a had fairly quick response (25.2 seconds) to an unfamiliar question on appropriate subject headings;

12 chose the best response, 6 chose the next best. 2.2a asked what the tracing from a replica subject fiche could tell the student and 18 chose "subject headings" as a response. 5 said "other book titles" and why this response was chosen so frequently is puzzling. A fatigue or boredom factor may be operating here. Time was 20.4 seconds. 2.3a asked students to read a replica fiche entry and determine whether it was suitable. This required considerable reading which may explain the length of response time (27.6 seconds) but only 3 said it was not useful, compared to 23 who said it was. When asked if the tracings would help, 29 said yes, 1 said no (2.4a average time 8.6 seconds). Question 2.5a asked for title, call number and location identification which had 27 accurate responses in 18.7 seconds. 2.1b asked students to select an appropriate citation from a replica of an index page. 18 chose the correct response in an average of 32.1 seconds, the length of time being due in part to the amount of reading required. 14 respondents correctly chose the right number of authors (2.2b) in an average of 23.4 seconds; 13 respondents identified the longest article (2.3b) in 29.5 seconds. 2.4b asked which journal article was published first, 13 gave the correct response in 22.4 seconds. 24 respondents replied in the average time of 23.4 seconds to 2.5b which asked for a determination of which article may best deal with the issue.

Conclusions

The PLATO software would seem to be adaptable to BI. It offers consistent instruction to many students on an individualized basis and allows for the most basic skills to be taught without penalizing more advanced students by waiting for all students to have the same skills. This project has shown that BI on PLATO is a viable delivery system. The results of this project would seem to be that call number and location code discrimination on microfiche and card catalogs can be easily learned. In addition, essential elementary search skills for periodical indexes can be taught and learned by using PLATO. The fact that many more students selected correct answers than those who chose incorrect answers seems to mean that successful teaching of BI concepts can occur using PLATO. Margins of success seem to be at times quite narrow while at other times they seem to be quite wide. This may be accounted for in some measure by flaws in either the experimental design or in the way the program was presented. There is a need for additional study and research. It would appear that PLATO can be a great tool in standardized BI presentations aimed at improving undergraduate academic performances.

Some problems need also to be mentioned. The program does not now reflect an ability to be adaptable to learning to use the on line catalog. The program as it presently exists is too long and needs to be rewritten to three or four smaller units; part of this reduction could be accomplished by the complete elimination of Simulation 2.

PLATO can effectively and efficiently teach elementary and essential library skills. It can teach beginning research techniques in a complete and standardized way that allows librarians to concentrate on more sophisticated BI based on skills PLATO has taught. As a BI tool, though not without its limits, it can effectively be integrated into a comprehensive BI program.